

REMARKS

Applicant appreciates the Examiner's thorough review of the present application, and the withdrawal of the previous rejections. The Office Action, however, rejected all pending claims 12-20 based on previously cited art and/or combinations thereof. Applicant respectfully requests reconsideration and withdrawal of the rejections for at least the following reasons.

Reconsideration and allowance of independent claim 12 (as previously amended) is respectfully requested in light of the following remarks. Claims 13-20 depend on amended claim 12, and therefore are considered to be in condition for allowance for at least the same reasons.

The Final Office Action rejected claims 12-14 and 16-20 under 35 U.S.C. § 103(a) as allegedly unpatentable over Applicants Admitted Prior Art (AAPA), by newly citing fig. 1a), in view of U.S. patent 6,369,451 to Lin. The embodiments defined by independent claim 12 define over the combination of AAPA and Lin in at least the ways described below.

The Office Action admitted that AAPA does not disclose or suggest "the interconnection portion including two parts ..." Instead, the Office Action relied on alleged teachings of Lin for this. According to Lin, the surfaces of all joining pads of a device carrier (substrate) 210 or 210' constitute the metal surface of the device carrier, and the surface of each joining pad is enclosed by an interconnection portion (a solder ball 225' composed of an inner one and a outer one), as shown in Figs. 2 and 3. In other words, each metal surface of a device carrier 210 or 210', used for connecting a chip 220 or 220', is enclosed by an interconnection portion (a solder ball composed of an inner one and a outer one) and of course is surrounded by the interconnection portion's end which is on device carrier 210 or 210'.

In contrast, according to the claimed embodiments, both the end 37 (Fig. 6) and end 57

of an interconnection portion which are on a device carrier (lead frame 7) are surrounded by the metal surface 72 of the device carrier 7. This aspect is embodied in claim 12 by at least the language that defines "said end of said second part is surrounded by said end of said first part, said end of said first part is surrounded by said metal surface, said second part is wrapped by said first part, said first part has a melting point lower than that of said second part, and said first part adheres to said second part."

The art according to U.S. Patent 6,369,451 is certainly infeasible if the device carrier 210 or 210' is a lead frame enclosed by a metal surface, because the outer layer of solder ball 225' would have to spread over the metal surface (see Figs. 2 and 3), as can be understood by those skilled in the art. Accordingly, no reasonable success of combining AAPA and the art of U.S. Patent 6,369,451 to make the claimed embodiments should have been reasonably expected. In fact, the teachings of AAPA and the art of U.S. Patent 6,369,451 conflict in view of the surrounding and enclosing of each metal surface of a device carrier by an interconnection portion according to the art of U.S. Patent 6,369,451.

Moreover, the fact that each metal surface of a device carrier for connecting a chip according to U.S. Patent 6,369,451 (i.e., the surface of each joining pad of device carrier 210 or 210') is enclosed and surrounded by an interconnection portion, taught away from combining AAPA and the art of U.S. Patent 6,369,451 to make the claimed embodiments wherein the metal surface 72 of a device carrier 7 surrounds each interconnection portion which connects the device carrier to a chip or die.

Furthermore, and as a practical matter, had reasonable expectation of success been found in the prior art (which was published more than 3 years ago), there should have been a lot of systems developed and other prior art published by now, providing such practical apparatus,

where a chip is connected via an interconnection portion to a device carrier enclosed by a metal surface (i.e., to a device carrier without need of, either a joining pad formed thereon and surrounded by insulation layer, or mask layer to surround a joining portion formed thereon).

To establish a case of obviousness, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure (*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438, Fed. Cir. 1991). The fact the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a case of obviousness without some objective reason to combine the teachings of the references (*Ex parte Levengood*, 28 USPQ2d 1300; *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1318, Fed. Cir. 2000). See also *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1318 (Fed. Cir. 2000).

Evidence showing there was no reasonable expectation of success may support a conclusion of nonobviousness. *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976). See also *Amgen, Inc. v. Chugai Pharmaceutical Co.*, 927 F.2d 1200, 1207-08, 18 USPQ2d 1016, 1022-23 (Fed. Cir.), cert. denied, 502 U.S. 856 (1991).

There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998), the combination of the references taught every element of the claimed invention, however without a motivation to combine, a rejection based on a *prima facie* case of obvious was held improper. The motivation to combine AAPA and the art of U.S. Patent 6,369,451 should not have reasonably existed, in view of the conflict between the teachings of AAPA and the art of U.S. Patent 6,369,451, i.e., each metal surface of a device carrier according to the art of U.S.

Patent 6,369,451 is enclosed and surrounded by the end of an interconnection portion which is on the device carrier, while the metal surface of a device carrier according to AAPA surrounds the end of each interconnection portion which is on the device carrier.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also *In re Lee*, 277 F.3d 1338, 1342-44, 61 USPQ2d 1430, 1433-34 (Fed. Cir. 2002).

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). See also *In re Fritch*, 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992).

The features included in independent claim 12 are neither anticipated nor suggested by the combination of U.S. Patent 6,369,451 and AAPA, not to mention that the desirability or teaching or suggestion to make the claimed embodiments and the reasonable expectation of success of the claimed embodiments were not both found in the prior art, even less of motivation to combine AAPA and the art of U.S. Patent 6,369,451 in view of the conflict between the teachings of AAPA and the art of U.S. Patent 6,369,451.

Accordingly, claim 12 patently defines over the cited art and is in proper condition for

allowance. Claims 13- 20 depend on claim 12, and all such dependent claims therefore are in condition for allowance and such action is respectfully requested.

CONCLUSION

In view of the foregoing, it is believed that all pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

No fee is believed to be due in connection with this amendment and response to Office Action. If, however, any fee is believed to be due, you are hereby authorized to charge any such fee to deposit account No. 20-0778.

Respectfully submitted,

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